Conflicts of interest in IPO pricing

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Abstract

We study how IPO pricing is affected by the conflicts of interest arising from the affiliations among underwriters, venture capitalists and institutional investors. We analyze the effects that conflicts of interest separately produce on the primary market (*absolute price adjustment*) and on the secondary market (*underpricing*). By using a sample of 2,026 IPOs in the US market between 1997 and 2010, we find that all types of conflicts of interest strongly and positively affect the primary market price, suggesting a dumping ground behavior. In addition, the previously unstudied affiliation between venture capitalists and institutional investors is the only conflict of interest which significantly and positively influences the secondary market price. Finally, we introduce the *relative price adjustment* to interpret the link between the primary and secondary market effects and we find that the dumping ground behavior in the primary market was, in fact, nepotism.

JEL Codes: G24, G31, G23

Keywords: initial public offerings; affiliations; conflicts of interests; pricing; primary market; secondary market.

1. Introduction

The pricing of initial public offerings (IPOs) has been deeply investigated in the literature, mostly because of the well-known underpricing puzzle. While the mainstream literature focuses on the asymmetric information as a potential ground for underpricing, only a few studies focus on the affiliations among IPO main players, namely underwriters, institutional investors (usually mutual funds) and venture capitalists. When these players deal with non-affiliated ones each of them follows their own interest, but when they deal with affiliated ones conflicts of interest may arise. If this is the case, one of the players is likely to take advantage of the situation in terms of pricing.

This paper examines if and how the affiliations among the main players involved in an IPO might influence the IPO pricing in both the primary and the secondary market. In our analysis we fill two main shortcomings in the literature, which are: the effects of the affiliation between venture capitalists and institutional investors and the relation between the primary and secondary pricing in the presence of conflicts of interest.

The existence of affiliations and of consequent potential conflicts of interest is widespread in the financial field (Berger et al., 1999; Crockett et al., 2004). This industry's shape is the consequence of both consolidation and differentiation strategies realized by the major players in the industry, combined with regulation that progressively reduced barriers to cross ownership of financial companies (i.e. Financial Services Modernization Act, FSMA, 1999). As such, the topic of conflicts of interest in IPOs is relevant not only to the academic community but also to the regulators, because of the need to defend investors from adverse effects on prices. Despite regulators having tried for years to protect investors from conflicts of interest among financial players, they also have repeatedly relaxed limitations imposed on deals between investment banks and their affiliated funds.

The Investment Company Act of 1940 and Rule 10(f)-3 adopted by the SEC in 1958 imposed restrictions on mutual funds buying any of the shares in a security offering during the existence of the syndicate if the fund was in any way related to any syndicate members. The spirit of those rules was to prevent the underwriter from using funds under its control as a dumping ground for unmarketable securities that would have been transferred to the fund's clients. In the following years, the SEC amended Rule 10(f)-3 several times. In 1979 a limit was introduced to allow an affiliated fund to buy up to 4% or $500,000 of an offering, whichever was the greater, although in no circumstances could the purchase be more than a maximum percentage limit of 10% of the offering. In 1997 the SEC amended the rule again raising the maximum percentage limit to 25%, and the dollar amount limit was dropped. The SEC further amended the rule in 2003 to apply the percentage limit only when the affiliated underwriter was the principal underwriter. After all the original regulatory focus, which was aimed at protecting investors, has progressively given way to a progressive relaxation of regulatory requirements due to pressure from the financial industry. This relaxation could also have been the result of an incomplete perception by regulators of the effects that conflicts of interest produce on IPO pricing. Indeed, the literature on this topic presents several shortcomings which prevent us from fully understanding IPO pricing in the presence of potential conflicts of interest. On the one hand, the empirical evidence on the effects of affiliations on the IPO pricing process reaches inconsistent results. On the other hand, to the best of our knowledge, there is no previous study which deals with cases of affiliation between venture capitalist and institutional investors in IPOs, or with cases in which multiple conflicts of interest interact in the

same IPO. Finally, previous contributions fail to propose a framework to set apart the effects that affiliations produce in the primary market and secondary market prices.

Prompted by these considerations, we aim at contributing to the literature on IPO by studying the effects induced by conflicts of interest arising in the deal as a consequence of affiliations among the players involved. In order to develop our hypotheses on which interests do prevail and in which circumstances, we first identify the individual interests of the players with respect to the IPO pricing.

The *lead underwriters* face conflicting interests which they have to trade off (Gompers and Lerner, 1999): on the one hand, they have incentives to maximize the offer price both because they have a fiduciary responsibility to get the best price for the listing firm and because their compensation is proportional to the total offering value. On the other hand, a lower offer price could provide a bigger payout to institutional investors (Ritter, 1987; Tinic, 1988), leading to higher customer loyalty and more brokerage fees paid to the lead underwriters in future deals (Reuter, 2006). A lower IPO price will also reduce the risk of undersubscription (which would force the lead underwriter to purchase unsold securities in a firm commitment deal, Liu and Ritter, 2011), decrease the need to provide price stabilization in the aftermarket (Logue et al., 2002), and finally increase the gains from the exercise of the overallotment option, given a lower strike price (Jenkinson et al., 2003).

Compared to the underwriters, *institutional investors* have a simple and clear interest in paying the lowest possible price for the shares, in order to maximize the performance of funds they manage and consequently increase the management and performance fees they earn from their clients. Previous literature indicates that many institutional investors are interested in the short term gains associated with underpricing in IPO investments (Jenkinson et al., 2003 and Rock, 1986).

Finally, *Venture Capitalists* (if any in the deal) tend to have their interests aligned with those of the firm as, being insiders, they are interested in obtaining the highest possible price for their shares in the IPO. Because underpricing "*leaves money on the table*", VCs want to keep that money as much as possible. Nevertheless, when they are conditioned by a lock up obligation[1] what matters to them is not the price at the IPO but the price at the expiration of the lock up period. If this is true, they could accept a lower offer price at the IPO if they believe the price will rise in the subsequent months.

Despite the fact that each player could show a strong individual interest in obtaining a higher or lower pricing, the affiliation among them can severely change their perspective and, consequently, their behavior. Up to now, the literature focuses on only two cases of affiliation, namely venture capitalists-lead underwriters (VC-LM) and lead underwriters-mutual funds (LM-F); no evidence is provided on venture capitalist-mutual fund affiliation and also in case of a multiple conflict of interest among all the players.

With reference to the first studied affiliation (VC-LM), the results are limited and not always consistent. In particular, by analyzing the US market Gompers and Lerner (1999) first find a positive effect of the affiliation on underpricing. Authors justify such a result with the "*rational expectation hypothesis*", as investors require a higher discount at the offering to compensate for potential adverse selection. This result is confirmed by Hamao et al. (2000) in the same US market,

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[1] That is they cannot sell their shares prior to a certain date, usually 6 months.

even if after controlling for the long-run performance they find no differences between affiliated and non-affiliated venture backed IPOs. Opposite results are reached by Arikawa and Imad'eddine (2010) on the Japanese market as they find a decrease in underpricing where there is affiliation. Similar results are reached by Chahine and Filatotchev (2008) in the French market. They find that the first day initial return is negatively related to the affiliation whereas the opposite is true for the one year performance, suggesting that in the long run both the VC and the LM have an interest in having satisfied investors in order to build and maintain their reputation in the IPO market.

With reference to the second conflict of interest (LM-F), results are unclear as the studies on the topic often consider different measures of return that can only partially be linked to IPO pricing. Ritter and Zhang (2007) (henceforth RZ2007) is the only contribution which empirically studies the direct relationship between the first day initial return (underpricing) and the reported holdings of funds affiliated (if any) to the lead underwriter in the six months after the offer. For the US market in the period 1990-2001 they find that this conflict of interest resulted in an increase in underpricing. Despite the fact that the relationship they find is positive, the results are slightly significant only for the internet bubble sub-period (1999-2000), characterized by a hot issue market. To obtain more significant results, the authors propose a further model in which they substitute the underpricing with the pre-market price adjustment, calculated as the percentage difference between the offer price and the midpoint of the initial price range, which they consider the best predictor of the underpricing itself. The relationship holds in that an increase in underpricing due to the affiliation of mutual funds is confirmed and also the significance of the result improves. Such evidence, stronger in the hot issue market sub-periods, is interpreted with the nepotism hypothesis in that lead underwriters allocate hot IPOs (with higher underpricing) to their affiliated funds so as to boost their performance. A different analysis is proposed by Johnson and Marietta-Westberg (2009), taking into account the returns realized by institutional investors affiliated to IPO lead underwriters in the IPO subsequent quarter, which is only indirectly linked with the IPO underpricing. Even if not directly comparable to RZ2007, they provide evidence that returns realized by affiliated funds are lower than those realized by independent asset managers holding the same shares but free from any conflict of interest with the underwriter. Similarly, Hao and Yan (2012) compare the performance of a sample of lead underwriter affiliated and non-affiliated funds in the quarter after the IPO issue date and find strong evidence that affiliated funds significantly underperform unaffiliated funds.

By making use of a larger sample of IPOs, both in terms of the time frame considered (1997-2010) and the number of firms (2026), we first find new and more robust evidence on the impact of each individual conflict of interest on IPO pricing, adding the unexplored case of affiliation between venture capitalists and mutual funds and also multiple affiliations. We also deepen the knowledge of IPO pricing by setting apart the effects that any of the potential conflict of interests produces on the primary market price (measured by the price adjustment) and on the secondary market price (measured by the underpricing). The idea behind this distinction is that in the primary market the effects are the result of the behavior of the above mentioned main players, while in the secondary market the effects are also related to the reaction of all investors, including retail ones, to the conflicts of interest.

The remainder of the paper is organized as follows: in Section 2 we present our models and hypotheses; data, methodology and empirical analyses are carried out in Section 3, while in Section 4 we discuss the main results. Section 5 concludes.

2. Affiliations and IPO pricing

Past literature primarily focuses on underpricing as the most common measure of IPO performance (for a review see Ljungqvist, 2007). Nonetheless, underpricing tells us only a part of the story, as it measures the performance of the secondary market only, i.e. the difference between the price at the end of the first day of trading and the IPO offer price. The literature is in short supply of studies about the primary market performance, mainly due to the lack of disclosure on bookbuilding activity (one of the few available studies is by Cornelli et al., 2006). Nonetheless, the most relevant part of negotiations among IPO key players is performed during the primary market, when the investment bank builds up the demand schedule of institutional investors through bookbuilding and combines it with the issuer's preferences, in order to settle the offer price. Still, not only affiliated players' behavior is influenced by their conflicts of interest, but also unaffiliated institutional investors, being informed and recurrent players, might notice the existence of conflicts of interest among other players and shape their primary market demand according to the positive or negative signals they perceive from such conflicts.

The impact of affiliation on secondary market performance (underpricing) could differ from the primary market for several reasons: the behavior of investors who did not participate in the bookbuilding (retail investors but possibly also institutional ones); the presence of primary market investors that can also be active in the secondary market buying (if they were rationed) or selling (if they are speculative). Moreover, awareness about potential conflicts of interest among players is not homogeneous between primary and secondary market participants. In particular, while the affiliation between LM and VC is public information observable from the prospectus, other affiliations involving funds cannot be tracked officially in advance; in fact, there is normally no possibility of being informed about the institutional investors that take part in the bookbuilding process. Still, given the strict and long term relationships established among players in the financial field, we argue that at least institutional investors might have informal access to details on the primary market allocation before the first day of trading, while other investors will have to wait until official disclosure (i.e. after the IPO conclusion and the publication of quarterly reported holdings by institutional investors).

As a consequence, we will test the effects of different types of affiliation on two measures of IPO performance: the *absolute price adjustment - APA* (calculated as in RZ 2007 and reported in equation [1]) as the result of the conflicts between the interests involved in the primary market; the conventional *underpricing - UP* (that is the difference between the first day closing price and the offer price, see equation [2]) which depends on the way the conflicts of interest are figured out by secondary market participants. Eventually, we will propose a method to fully understand the equilibrium between primary and secondary market behavior, referred to as "*partial adjustment*" by Hanley (1993), analyzing the *relative price adjustment – RPA* (calculated as in equation [3]) .

$$APA = \frac{OP - MFP}{MFP} \qquad\qquad [1]$$

$$UP = \frac{MP - OP}{OP} \qquad\qquad [2]$$

$$RPA = \frac{APA}{APA + UP} \qquad\qquad [3]$$

In detail: APA is the absolute price adjustment; OP is the final offer price of the IPO; MFP is the midpoint of the initial filing price range [that is (higher price + lower price /2)]; UP is the underpricing; MP is the first day closing market price; RPA is the relative price adjustment.

2.1 Absolute Price Adjustment (APA) hypotheses

The first group of hypotheses is addressed towards figuring out if and how the different conflicts of interest that may exist are likely to influence the way the lead managers (LM) set the IPO offer price. In describing the different hypotheses we also take into account the possibility, previously proposed by RZ2007 and Hanley (1993), that the price adjustment is somehow related to the LM expectations on the success of the issue in the secondary market. For this reason, we relate the pricing hypotheses to hot (more underpriced) or cold (less underpriced) IPOs as a proxy of their secondary market success.

1. Affiliation between the lead managers (LM) underwriting the IPO and the venture capitalists[2] (VC) selling their shares through IPO (LM-VC):

   In this case the conflict of interest is known by outsiders, thanks to details reported in the deal prospectus. The interest of VC is, like that of the others issuing firm shareholders, to get the highest possible offer price; LM, on the contrary, could prefer a lower offer price that makes the deal more easily manageable and also has a positive impact on reputation. The only drawback for LM would be that their commissions are related to the IPO proceeds. In this sense, the two players' interests are aligned for some reasons while conflicting for others. So, the competitive hypotheses we are going to test on the LM-VC affiliation are:

   o *H1a: when VC and LM are affiliated the APA increases.*
      Under this hypothesis, LM are paid from the commission they receive from the IPO proceeds and also from the money that the affiliated VC make from a higher offer price. Therefore, even if such a larger price adjustment is not welcomed by institutional investors, LM are well compensated for their disappointment. Moreover, the affiliation between LM and VC suggests an increase in the offer price as a consequence of the lower asymmetric information LM suffers from VC (less agency costs). This outcome is more likely to be observed in hot IPOs, where the disappointment of institutional investors due to buying at a higher primary market price is reduced because of the still high pricing they are likely to have in the secondary market.

   o *H1b: when VC and LM are affiliated the APA decreases.*

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[2] We consider all the lead managers of an IPO and also all the venture capitalists if there are more than one.

Under this hypothesis, LM prefer to favor institutional investors to compensate them for the adverse selection they might suffer (rational discounting) and in order to maximize underwriting commissions from retained funds in subsequent IPOs. This outcome is more likely to be observed in cold IPOs, where LM are strongly induced to reduce the offer price in order to attract institutional investors and then successfully complete the bookbuilding.

2. <u>Affiliation between lead managers (LM) underwriting the IPO and institutional funds (F) buying shares in the IPO (LM-F):</u>
The interests of LM are the same as before, whereas F are interested in paying the lowest possible offer price which would boost their performance and this in turn would increase future money inflows from asset management commissions. If LM and F are affiliated, we also have to consider that allocation to affiliated funds implies fewer commissions for LM from non-affiliated funds.
The competitive hypotheses we are going to test for the LM-F affiliation are:

o *H2a: when LM and F are affiliated the APA increases*
In this case, LM are allowed to increase the offer price as the higher fees from underwriting the deal compensate for a worse performance by the affiliated funds from buying highly priced IPOs and from the lower commission paybacks from unaffiliated funds, as suggested by Ber, Yafeh and Yosha (2001). As before, this is more likely the case for hot IPOs as such market conditions will help to create a still positive underpricing gain for institutional investors even if they paid a higher offer price for the shares

o *H2b: when LM and F are affiliated the APA decreases*
In this case, LM reduce the offer price as the lower fees they earn by underwriting the deal are compensated by the higher present value of future asset management fees from affiliated funds, boosted by their good performance on the secondary market. Moreover, in the case of cold IPOs, LM is pushed to reduce the offer price in order to successfully complete the bookbuilding.

3. <u>Affiliation between venture capitalists backing the IPO and institutional funds buying shares in the IPO (VC-F):</u>
On the one side VC are interested in maximizing the offer price in order to increase their exit gains. However, in the presence of affiliated funds the offer price could be lower, in order to guarantee better performances to the latter and the consequent maximization of asset management fees. So, the competitive hypotheses which we are interested in testing in this case are:

o *H3a: when VC and F are affiliated the APA increases*
Under this hypothesis, the interest of VC prevails as the higher proceeds induced by a higher offer price more than compensate the lower asset management fees induced by the lower performance of the affiliated fund. As before, in the case of hot IPOs it is more likely that the higher price paid by institutional investors does not imply a lower gain from underpricing.

o *H3b: when LM and VC are affiliated the APA decreases*
In this case, VC set a lower offer price because a good performance of the affiliated funds is more convenient than a higher exit gain. This situation is more likely to occur in cold IPOs because VC are pushed to reduce the offer price in order to successfully complete the offer.

A concluding remark on the VC interests is that, other things being equal, if there is a lockup clause that prevent VC from selling their shares, they do not immediately suffer from a lower offer price, since the relevant price is the longer term one, when the lockup expires. This circumstance is embraced in the analysis by including the dummy for the lock up period as a determinant of the APA.

2.2 Underpricing hypotheses

The second group of hypotheses is addressed towards figuring out if and how the different conflicts of interest that may exist are likely to influence the behavior of secondary market participants and then the first day market price (and so the underpricing). As above, we also discuss the difference between hot and cold IPOs.

4. Affiliation between lead managers (LM) underwriting the IPO and venture capitalists (VC) selling shares through IPO (LM-VC):

   In this case, the secondary market participants are informed about the conflict of interest as both the name of VC and of LM are publicly disclosed. As a consequence, the underpricing depends on their feeling about the conflict of interest.

   o *H4a: when LM and VC are affiliated the UP increases*
   The affiliation between LM and VC is a good signal for the secondary market participants because of the lower asymmetric information between LM and VC (lower agency costs). As a consequence, the market price is pushed up, producing a higher underpricing. In the case of hot IPOs, the good signal coming from the affiliation of interest could be a further boost to the already consistent demand by the secondary market.

   o *H4b: when LM and VC are affiliated the UP decreases*
   The affiliation between LM and VC is a bad signal for the secondary market participants because of the adverse selection (larger agency costs). As a consequence, the demand for the IPO decreases and the market price is pushed down, thus producing a lower underpricing. Moreover, in case of cold IPOs, the bad feeling coming from the conflict of interest could weaken the already scarce demand.

5. Affiliation between lead managers (LM) underwriting the IPO and institutional investors (F) buying shares through IPO (LM-F):

   In this case, we cannot be sure that all secondary market participants are aware of the conflict of interest as this becomes public information only after several months with the publication of quarterly reported holdings by institutional investors. Nonetheless, given the strict and long term relationships established among players in the financial field, we argue that at least institutional investors might have informal access to the identity of the participants in the primary market allocation, before the first day of trading. If this is true, the market price could be affected by this information.

   o *H5a: when LM and F are affiliated the UP increases*
   The secondary market price is pushed up (and so the underpricing) by the high demand from investors who interpret the presence of the conflict of interest as a good signal. In particular, if investors believe that affiliated funds are favored in the allocation of more underpriced

IPOs ("nepotism hypothesis", as proposed by RZ2007) they will increase their demand for those IPOs. This effect should be higher, then, in hot IPOs.

- *H5b: when LM and F are affiliated the UP decreases*
  The secondary market price is pushed down (and so the underpricing) by the low demand from investors who interpret the presence of the conflict of interest as a bad signal. Such an effect should be higher in cold IPOs because other investors believe the LM is "dumping ground" (as proposed by RZ2007) the IPO to affiliated funds.

6. <u>Affiliation between the venture capitalists backing the IPO and the institutional investors buying shares in the IPO (VC-F):</u>
   As in the previous case, we cannot be sure that all secondary market participants are aware of the conflict of interest. The hypotheses are as follows:

   - *H6a: when VC and F are affiliated the UP increases*
     Similarly to hypothesis 5a, the secondary market participants associate the affiliation between sellers (VC) and buyers (F) as a positive signal since they believe that the former are going to favor the latter by selling them the best deals in a sort of "self-dealing nepotism" scenario. We could expect this case to be more likely in hot IPOs, as for hypothesis 5a.

   - *H6b: when LM and F are affiliated the UP decreases*
     Similarly to hypothesis 5b, the secondary market participants interpret the affiliation as a means to facilitate the exit of VC from a difficult deal, by using a "self-dealing dumping ground" approach at the expense of affiliated funds. We could expect this case to be more likely in cold IPOs as for hypothesis 5b.

2.3   Relative Price Adjustment (RPA) hypotheses

The above mentioned hypotheses on the APA and on UP allow for the possibility that any of the conflicts of interest produce effects both in terms of primary market and also secondary market price. If this is so, we cannot be sure about where the affiliation has produced the larger price effect. In fact, where the relationships between any of the affiliations and the two price measures show the same sign for both primary and secondary market, we cannot say how and in favor of whom the conflict of interest has been solved.

In order to shed light on this point, we test another set of hypotheses on the *relative price adjustment – RPA* (calculated as in equation [3]). In particular, a larger RPA related to an affiliation tells us that the corresponding conflict of interest produces most of its effect in the primary market with a higher offer price. As before, we test a series of hypotheses referred to the different conflicts of interest in order to understand which interests do really win the conflict:

7. <u>Affiliation between lead managers (LM) underwriting the IPO and venture capitalists (VC) selling the shares through IPO (LM-VC):</u>

   - *H7a: when LM and VC are affiliated the RPA increases*
     The conflict of interest pushes up the offer price, other things being equal, favoring VC.

   - *H7b: when LM and VC are affiliated the RPA decreases*
     The conflict of interest pushes down the offer price, other things being equal, favoring LM.

8. <u>Affiliation between lead managers (LM) underwriting the IPO and institutional investors (F) buying shares through IPO (LM-F):</u>

- o *H8a: when LM and F are affiliated the RPA increases*
  The conflict of interest pushes up the offer price, other things being equal, favoring LM.
- o *H8b: when LM and F are affiliated the RPA decreases*
  The conflict of interest pushes down the offer price, other things being equal, favoring institutional investors.
9. <u>Affiliation between venture capitalists backing the IPO and institutional investors buying shares in the IPO (VC-F)</u>:
   - o *H9a: when F and VC are affiliated the RPA increases*
     The conflict of interest pushes up the offer price, other things being equal, favoring VC.
   - o *H9b: when F and VC are affiliated the RPA decreases*
     The conflict of interest pushes down the offer price, other things being equal, favoring institutional investors.

3. Data sources and sample description

3.1 Data

We searched the Thomson One Deals (TOD) database for all IPOs on the Amex, NYSE and NASDAQ exchanges from January 1997 to December 2010. Similarly to RZ2007, we excluded from our search financial firms, ADRs, REITs, Closed-end funds, non common shares issues and shares with an offer price below 5$. We found 3,017 IPOs matching these criteria.

We then retrieved from the Thomson One Ownership (TOO) database ownership data of institutional investors coming either from the SEC filings of funds (Form N30D) or shareholder holdings (Form 13F). We used the first reported holdings within the first two quarters after the offer for each IPO as our proxy for the initial IPO allocations, because the actual allocations are not publicly available. Searching the database on this assumption, we eventually end up with 2,026 matching IPO observations with ownership data.

From the TOD database we also obtained lead manager (LM) and venture capitalist (VC) names, while funds (F) names were retrieved from the TOO database. Following Gompers and Lerner (1999) and RZ2007, we determined the affiliation between players by manually matching their names, based on the presumption that a prestigious investment bank would protect its brand name and only allow its affiliated VC or funds to use it. Later we cross checked these affiliations by gathering further information on banking groups from their websites and their past history.

Since the main goal of this paper is to understand the behavior of players with conflicts of interest in the IPO pricing process by using a wider approach with respect to previous literature, we did not exclude from our sample either non-venture backed IPOs (as in Gompers and Lerner, 1999) or IPOs with lead managers without affiliated funds (as in RZ2007).

3.2 Descriptive Statistics

Our sample covers quite a long historical period (1997-2010) characterized by an initial hot IPO wave (1997-2000), mainly due to the listing of dot com companies. Indeed, as reported in Table 1, 57% of all deals included in the database, equivalent to 40% of funds collected, were concluded before 2001. After the market crash occurred with the bursting of the internet bubble, a new positive period for IPOs started back in 2004, lasting another 4 years before the drop occurred with the financial crisis of 2008. The average first day underpricing declined from the high double digit

figure of the late Nineties to the single digit figure of more recent years (the highest average level was 77% in 1999 while the lowest average was 7% in 2010).

As for the industry distribution (reported in Table 2), 32% of IPOs were in the high-tech industry, followed by 15% in healthcare and 11% in consumer products. More than 52% of the deals were Venture Capital backed.

Table 3 reports details on affiliations among players in our sample. To retrieve affiliations of lead managers, we first consider only affiliations involving any of the mandated lead managers (differently from RZ2007, who consider only the first lead manager). The most frequent affiliation (61.7% of cases) emerges between lead managers and funds. Affiliations between venture capitalists and funds emerge in 26.4% of cases while one of the selling venture capitalists appointed an affiliated investment bank as lead manager of the IPO in only in 5.2% of cases. Multiple affiliations involving all members at the same time are also present, even if they account for just 2.8% of our database. Finally, affiliations were completely absent in only 29.8% of deals.

Table 1: Temporal distribution of sample IPOs

Issue year	Number of deals	Number of deals (% of total)	Total proceeds	Total funds (% distribution)	First day underpricing (Average)	Offer Size Average
1997	326	16%	24,811	8%	15%	76.1
1998	194	10%	26,828	8%	28%	138.3
1999	353	17%	42,112	13%	77%	119.3
2000	280	14%	34,179	11%	59%	122.1
2001	63	3%	23,251	7%	14%	369.1
2002	58	3%	11,300	4%	10%	194.8
2003	54	3%	8,917	3%	10%	165.1
2004	159	8%	27,731	9%	11%	174.4
2005	130	6%	25,398	8%	11%	195.4
2006	129	6%	24,220	8%	12%	187.7
2007	132	7%	24,622	8%	15%	186.5
2008	21	1%	4,702	1%	4%	223.9
2009	43	2%	13,577	4%	9%	315.7
2010	84	4%	27,609	9%	7%	328.7
Total	2026	100%	319,256	100%	32%	157.6
			Median		11.2%	75.0
			Minimum		-86.7%	4.35
			Maximum		636.4%	15,774.0
			Standard deviation		65.6%	478.86

Table 2: Industry distribution of sample IPOs

Sectors	Number of deals	Number of deals (% weight)	First-day underpricing (Average)	Venture Backed
Consumer Products and Services	214	11%	32%	98
Consumer Staples	56	3%	14%	9
Energy and Power	92	5%	12%	23
Government and Agencies	1	0%	32%	1
Healthcare	309	15%	12%	238
High Technology	658	32%	56%	441
Industrials	178	9%	13%	44
Materials	73	4%	8%	16
Media and Entertainment	94	5%	24%	37
Real Estate	97	5%	4%	4
Retail	120	6%	24%	57
Telecommunications	134	7%	45%	90
Total	2026	100%	32%	1058

**Table 3: Affiliations among players in IPOs (1997-2010)**

APA is the absolute price adjustment; UP is the underpricing; RPA is the relative price adjustment.

Affiliation type	N.cases	% weight over the sample	APA	UP	RPA
Venture Capital - Lead manager	105	5.2%	11.25%	47.13%	18.08%
Lead Manager - Fund	1250	61.7%	5.85%	34.39%	17.53%
Venture Capital - Fund	535	26.4%	8.07%	47.58%	46.17%
Venture Capital - Lead manager - Fund	58	2.8%	10.03%	43.84%	0.09%
No affiliation	604	29.81%	-2.09%	21.87%	14.64%
Total	2026	100%	3.37%	31.68%	21.34%

As reported in Figure 1, the frequency of affiliations among players evolved during time. In particular, relationships among lead managers and funds increased throughout the period while other types of affiliation reported alternate paths without a clear trend toward increase or decrease. Such evidence could be explained by an effective greater use of affiliation relationships to facilitate the conclusion of the deals, as well as by the consolidation in the financial industry involving investment banks and institutional investors.

Figure 1: Evolution in affiliations among players

Affiliations are presented as percentage of the overall sample referred to a particular year.
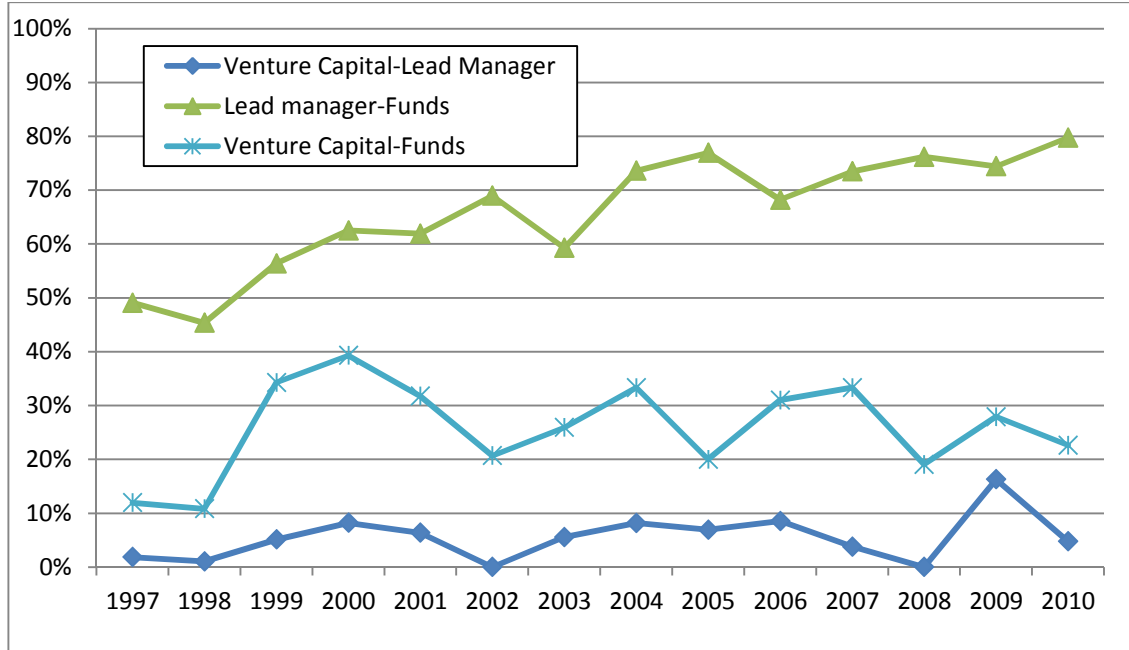
4. Empirical analysis and results

4.1 Absolute price adjustment

To test the impact of affiliation on IPO pricing in the primary market, where lead managers collect the orders from institutional investors (bookbuilding) to determine the offer price, we estimate the regression reported in equation [4]:

$$APA = \alpha + \beta_1 D_{lockup} + \beta_2 LM_{rank} + \beta_3 SIZE + \beta_4 D_{tech} + \beta_5 D_{year} + \beta_6 D_{VCbacked} +$$
$$\beta_7 D_{ALMVC} \_ or \_ \beta_8 D_{ALMF} \_ or \_ \beta_9 D_{AVCF} \_ or \_ \beta_{10} D_{LMVCF} + \varepsilon$$

[4]

The dependent variable is the absolute price adjustment (APA), which measures the percentage difference between the final offer price and the midpoint of the price range initially filed to the SEC.

Independent variables can be divided into two groups. The first group includes six control variables that are commonly used in the literature as determinants of IPO pricing (see RZ200 and Gompers and Lerner, 1999). In particular, D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation (which forces them to wait until a certain lockup expiration date before liquidating their stake) and zero otherwise. LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter[3] . SIZE is the natural logarithm of the total assets of the company at the IPO. D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry (such as software, semiconductor, IT) and zero otherwise. D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event

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[3] See http://bear.warrington.ufl.edu/ritter/ipodata.htm

and zero before. Finally, $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company and zero otherwise.

Table 4 – Absolute Price Adjustment regressed on affiliation dummies and other control variables

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise.

Variables	H1	H2	H3	Multiple Affiliation
D_{lockup}	-0.1098***	-0.1011***	-0.1097***	-0.1099***
	0.000	0.000	0.000	0.000
LM_{rank}	0.0119**	0.0027	0.0107**	0.0116**
	0.012	0.606	0.023	0.014
SIZE	0.0050	0.0041	0.0057	0.0053
	0.247	0.345	0.183	0.222
D_{tech}	0.1231***	0.1204***	0.1196***	0.1223***
	0.000	0.000	0.000	0.000
D_{year}	-0.1088***	-0.1223***	-0.1112***	-0.1087***
	0.000	0.000	0.000	0.000
$D_{VC\ backed}$	0.0229	0.0347**	0.0070	0.0266*
	0.101	0.011	0.668	0.055
D_{ALMVC}	0.0772***			
	0.008			
D_{ALMF}		0.0624***		
		0.000		
D_{AVCF}			0.0454***	
			0.007	
D_{ALMVCF}				0.0586*
				0.075
Constant	-0.0125	0.0267	-0.0061	-0.0113
	0.751	0.514	0.877	0.776
Observations	1,768	1,768	1,768	1,768
R-squared	0.173	0.177	0.173	0.171

The second group contains the core explanatory variables for this study, which are those capturing the conflicts of interest among financial players involved in the deal. More in detail, D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise. Similarly, D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise. D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise. Finally, D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists,

lead managers and at least one of the funds buying the shares belong to the same financial group and zero otherwise.

Each affiliation dummy has been tested both in terms of individual impact[4] and in combination with other affiliation dummies (multiple affiliation). Results are reported in table 4.

With reference to the first group of explanatory variables, we find a confirmation of the results already provided by previous literature. In particular, other things being equal, the IPO of a high tech company (D_{tech}), especially when carried out during the internet bubble (D_{year}), results in higher absolute price adjustments, which means higher offer prices. Similarly, in most of our models, a higher ranking of the lead underwriters and a venture backed deal show significant positive impact on APA, while size is never significant. The presence of a lock up agreement, instead, reduces the APA.

After controlling for the above mentioned variables, we find that all affiliation dummies are positively and significantly related to the absolute price adjustment (columns 1 to 3 table 4). Moreover, the positive effect also persists in the case of a multiple affiliation (last column of table 4).

So far, we can infer that no matter which parties are involved, an affiliation among IPO financial players results in higher offer prices and so in a higher APA.

Such evidence confirms our hypotheses H1a, H2a and H3a. In particular, when venture capitalists choose affiliated lead managers and/or sell their shares to affiliated funds it is more likely that they will receive a higher price compared to the original price range. Similarly, when lead managers are selling part of the shares to affiliated funds they will do so at a higher offer price. In all cases in which funds are affiliated with lead managers and/or venture capitalists, they will apparently receive more expensive IPOs.

We refer to the hypotheses section for the analytical explanation of the reasons behind these effects. We have already discussed in Section 2 the possibility of finding different results in the cases of cold and hot IPOs, basically because in the former case LM and VC have more incentives to dump the IPOs to affiliated funds, whereas in the latter case LM and the VC can set a higher APA without disappointing funds due to obtaining a low secondary market underpricing. In order to test this further hypothesis, we split the sample into cold and hot deals (having respectively a lower or higher underpricing than the average one) and ran the regression again. We find, as reported in Table A.1 in the Appendix, that the positive effect of affiliation between lead managers and funds on APA is confirmed no matter if the IPO is cold or hot, while the positive effects of other types of affiliation is confirmed only in hot deals, thus reinforcing hypothesis H1a and H3a.

4.2 Underpricing

Up to this point we found that affiliations positively influence the offer price and so the absolute price adjustment, unveiling a particular sensitiveness of primary market pricing behavior to affiliations among the players involved in IPOs. We are now interested in understanding if secondary market investors do pay the same attention to affiliations. One reason we could find for the possible different results was the characteristics of the secondary market which is settled by retail investors who are usually less informed than institutional ones. Moreover, the secondary

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[4] We also tested if the affiliation dummies are collinear with models H1, H2 and H3, finding that the results are unaffected.

market comprises institutional investors who did not take part in the primary market and also those who were rationed because of regulatory reasons or due to the will of the lead managers.

We carry out a second regression (equation [5]) whose dependent variable is the underpricing (UP), as measured by the difference between the closing price at the end of the first trading day and the IPO offer price, netted out of the market performance of the same day. The set of explanatory variables is the same as that already used in equation [4] except for the APA which is added to this new regression. Previous literature (Hanley, 1993 and more recently RZ2007) demonstrated that underpricing is highly correlated to premarket (absolute) price adjustment. As a consequence, we are interested in understanding if affiliations have any influence on the secondary market performance net of the positive influence on primary market performance which we have already found. Results are reported in Table 5.

$$UP = \alpha + \beta_1 D_{lockup} + \beta_2 LM_{rank} + \beta_3 * SIZE + \beta_4 D_{tech} + \beta_5 D_{year} + \beta_6 D_{VCbacked} +$$

[5]

$$\beta_7 D_{ALMVC} \_ or \_ \beta_8 D_{ALMF} \_ or \_ \beta_9 D_{AVCF} \_ or \_ \beta_{10} D_{LMVCF} + \beta_{11} APA + \varepsilon$$

All control variables are statistically significant and signs of relationships are similar to those we found for equation [4]. In addition, the size of the IPO is now negatively and significantly related to underpricing. The influence of the APA on underpricing is positive and strongly significant, as expected (Hanley, 1993). Such evidence, known as "partial adjustment phenomenon", is consistent with Benveniste and Spindt (1989) in a setting where lead managers do not fully adjust the offer price to the demand from the bookbuilding but leave part of the adjustment in the form of underpricing in order to compensate institutional investors who truthfully revealed their preferences during the bookbuilding itself.

As far as the conflicts of interest are concerned, all the coefficients are positive but only the affiliation between venture capitalists and funds is statistically significant. Empirical results do not support hypotheses H4 and H5 (significance is close for the latter, p-value is 0.146, but not reached). On the contrary, they do confirm hypotheses H6a concerning a positive effect of affiliation between VC and funds on underpricing because of what we called the "self-dealing nepotism" hypothesis and the positive signal associated with such an affiliation by the secondary market if observed by other investors.

Also in this case, we test our models by setting apart cold and hot deals. Results are reported in Table A.2 (see the Appendix). The positive impact on underpricing of the affiliation between VC and funds is confirmed only in hot deals. For the same group of deals, we find a positive effect on underpricing also in the case of affiliation between lead managers and funds. Confirmation of H6a and H5a (even if only for hot deals) lead us to conclude that when affiliated funds are involved the underpricing is also higher, thus supporting the nepotism hypothesis.

According to the results, affiliation among financial players influence IPO pricing mainly through the primary market, as the effects on underpricing seem to be almost totally absorbed by the absolute price adjustment (the APA is always extremely significant and positive on underpricing). Such evidence shows that institutional investors do pay attention to affiliation among players

starting from the primary market, while the secondary market seems to be less concerned about such conflicts of interest, at least during the first trading day.

Table 5 - Underpricing regressed on affiliation dummies, other control variables and APA

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise; APA is the absolute price adjustment.

Variables	H4	H5	H6	Multiple Affiliation
D_{lockup}	-0.1149***	-0.1088***	-0.1145***	-0.1147***
	0.000	0.001	0.000	0.000
LM_{rank}	0.0270***	0.0201*	0.0247***	0.0266***
	0.004	0.056	0.009	0.005
SIZE	-0.0464***	-0.0468***	-0.0460***	-0.0463***
	0.000	0.000	0.000	0.000
D_{tech}	0.1060***	0.1040***	0.1009***	0.1052***
	0.000	0.000	0.000	0.000
D_{year}	-0.0919***	-0.1020***	-0.0995***	-0.0919***
	0.001	0.000	0.000	0.001
$D_{VC\ backed}$	0.0932***	0.1041***	0.0466	0.0955***
	0.001	0.000	0.158	0.001
D_{ALMVC}	0.0758			
	0.195			
D_{ALMF}		0.0466		
		0.146		
D_{AVCF}			0.1024***	
			0.003	
D_{ALMVCF}				0.0734
				0.268
APA	1.1841***	1.1814***	1.1788***	1.1858***
	0.000	0.000	0.000	0.000
Constant	0.3110***	0.3395***	0.3293***	0.3134***
	0.000	0.000	0.000	0.000
Observations	1,768	1,768	1,768	1,768
R-squared	0.394	0.394	0.397	0.394

4.3 Relative price adjustment

Our results show that conflicts of interest between the main players involved into an IPO are likely to produce their pricing effects mainly in the primary market, consisting of an increase in the absolute price adjustment. Nevertheless, in some cases (affiliation between VC-F and also LM-F,

even if weaker) the affiliations give rise to both an increase in the absolute price adjustment and also in the underpricing. When this happens, as we anticipated above, we cannot be sure if the affiliation produces the larger price effect in the primary or in the secondary market and, more importantly, we cannot say how and in favor of whom the conflict of interest has been solved. In order to shed light on this point, we test the last set of hypotheses on the *relative price adjustment – RPA* (calculated as in equation [3]).

Table 6 – Relative Price Adjustment regressed on affiliation dummies and other control variables.

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 in where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise.

Variables	H7	H8	H9	Multiple Affiliation
D_{lockup}	0.2469***	0.2191***	0.2462***	0.2470***
	0.000	0.000	0.000	0.000
LM_{rank}	-0.0632***	-0.0354*	-0.0622***	-0.0628***
	0.001	0.090	0.001	0.001
SIZE	0.0323**	0.0360**	0.0311*	0.0321**
	0.045	0.025	0.052	0.046
D_{tech}	-0.2682***	-0.2603***	-0.2628***	-0.2666***
	0.000	0.000	0.000	0.000
D_{year}	0.1739***	0.2145***	0.1760***	0.1741***
	0.001	0.000	0.001	0.001
$D_{VC\ backed}$	-0.0607	-0.0836	-0.0513	-0.0652
	0.253	0.105	0.411	0.216
D_{ALMVC}	-0.1081			
	0.310			
D_{ALMF}		-0.1793***		
		0.003		
D_{AVCF}			-0.0405	
			0.525	
D_{ALMVCF}				-0.0955
				0.433
Constant	-0.3508**	-0.4778***	-0.3538**	-0.3538**
	0.028	0.004	0.027	0.027
Observations	1,388	1,388	1,388	1,388
R-squared	0.095	0.100	0.094	0.094

We verify our hypotheses by regressing the RPA on the two groups of independent variables already proposed in equation [4], namely control variables and affiliation dummies (see equation [6]):

$$RPA = \alpha + \beta_1 * D_{lockup} + \beta_2 * LM_{rank} + \beta_3 * SIZE + \beta_4 * D_{tech} + \beta_5 * D_{year} + \beta_6 * D_{VCbacked} +$$

[6]

$$\beta_7 D_{ALMVC} \_ or \_ \beta_8 D_{ALMF} \_ or \_ \beta_9 D_{AVCF} \_ or \_ \beta_{10} D_{LMVCF} + \varepsilon$$

The results reported in Table 6 only confirm hypothesis H8b. In particular, a negative coefficient in the case of affiliation between LM and F means that, in such deals, the proportional contribution of the APA to the total variation between the initial mid-point price and the market price at the end of the first trading day (i.e. the sum of APA and UP) is lower when this conflict of interest applies. As such, given that the APA is positively affected by this affiliation (hypothesis H2a) and given that the secondary market demand produces an underpricing that is even more pronounced (hypothesis H6a, even if significant only for hot IPOs), this last result on the RPA tells us that the primary market did not actually exploit all the effects of the affiliation between LM and F. Moreover, we are now forced to amend the interpretation we provided before because this last evidence suggests a nepotism behavior of the LM towards its affiliated funds more than a dumping ground attitude. By testing for hot and cold IPOs (see Table A.3 in the Appendix), we indeed find confirmation of such an effect in hot IPOs, as for hypotheses H2a and H5a.

In Table A3 we also notice that the affiliation between VC and funds is positively and slightly significantly related to a higher RPA for cold IPOs. Previous analyses showed that affiliated funds receive more highly priced IPOs (self-dealing dumping ground hypothesis H3a), but also highly underpriced IPOs (self-dealing nepotism hypothesis H6a). This was particularly true for hot IPOs. As such, this last evidence on cold IPOs works as a confirmation of the previous result in that, when the VC is managing cold IPOs the self-dealing dumping ground behavior prevails.

5.4 Impact of affiliation on longer horizon IPO performance

A final analysis we performed to check the robustness of our results aims to ascertain if affiliation among players might offer any signal for the "longer horizon performance" of IPO shares in the secondary market. By "longer horizon performance" we mean the IPO return 180 days after the initial listing day.

Indeed, 6 months after the initial public offering is the ideal horizon to check the effect of the conflicts of interest during the primary and secondary market: on one hand, after 6 months the market price for the shares should reflect all available information about the company, as analysts had the time and the opportunity for a deep evaluation of the company. Moreover, at that date the price is not influenced anymore by stabilization policies usually adopted by lead managers during the first month of trading. On the other hand, and more important to our study, after 2 quarters the disclosure on institutional investor ownership (and so the affiliations of funds with lead manager and venture capitalist, if any) is publicly available to all investors due to the SEC filing obligations. Last but not least, six months after the IPO institutional investors should have been able to align the amount of shares owned with their target levels, in case they received more or less shares than required during the primary market.

According to equation [7], the IPO return after 180 days (calculated as the difference between the closing price on the 180th trading day and the IPO offer price, as a percentage of the offer price, and then netted out of the percentage market performance registered on the time interval) is regressed over all control variables and affiliation dummies used in previous regressions, as well as on the first day underpricing. The results are reported in table 7.

Table 7 – Regression of the long run (6 months) performance on affiliation dummies

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise; UP is the underpricing.

Variables	H1, H4, H7 (180days return)	H2, H5, H8 (180days return)	H3, H6, H9 (180days return)	Multiple Affiliation (180days return)
D_{lockup}	-0.1690***	-0.1451**	-0.1688***	-0.1690***
	0.005	0.016	0.005	0.005
LM_{rank}	0.0609***	0.0335	0.0597***	0.0609***
	0.001	0.100	0.001	0.001
SIZE	-0.0329**	-0.0394**	-0.0339**	-0.0332**
	0.047	0.017	0.040	0.045
D_{tech}	0.2500***	0.2505***	0.2489***	0.2504***
	0.000	0.000	0.000	0.000
D_{year}	-0.0996*	-0.1468***	-0.1080**	-0.0999*
	0.061	0.008	0.043	0.060
$D_{VC\ backed}$	0.0339	0.0426	-0.0155	0.0322
	0.529	0.415	0.807	0.547
D_{ALMVC}	-0.0064			
	0.953			
D_{ALMF}		0.1882***		
		0.002		
D_{AVCF}			0.0882	
			0.177	
D_{ALMVCF}				0.0092
				0.939
UP	0.4335***	0.4241***	0.4285***	0.4332***
	0.000	0.000	0.000	0.000
Constant	-0.1293	0.0090	-0.1111	-0.1279
	0.401	0.955	0.472	0.407
Observations	1,905	1,905	1,905	1,905
R-squared	0.147	0.151	0.148	0.147

$$\text{Ret}_{180\text{days}} = \alpha + \beta_1 \text{D}_{\text{lockup}} + \beta_2 \text{LM}_{\text{rank}} + \beta_3 \text{SIZE} + \beta_4 \text{D}_{\text{tech}} + \beta_5 \text{D}_{\text{year}} + \beta_6 \text{D}_{\text{VCbacked}} +$$

$$\beta_7 \text{D}_{\text{ALMVC}} \_or\_ \beta_8 \text{D}_{\text{ALMF}} \_or\_ \beta_9 \text{D}_{\text{AVCF}} \_or\_ \beta_{10} \text{D}_{\text{LMVCF}} + \beta 11 * \text{UP} + \varepsilon$$

[7]

The first day underpricing plays a relevant role in explaining the six months performance, as expected since the former is a component of the latter. The effects of control variables replicate those observed for the underpricing with the exception of the venture backed dummy which is not significant here. As for the affiliation dummies, the only statistically significant influence is given by the affiliation between the lead manager and its funds. Such an affiliation has a positive impact on the six months performance, confirming what we found in the RPA analysis, as funds affiliated to lead managers obtain better IPOs.

5. Conclusions

In the last 15 years affiliation among financial players in IPO deals has been quite a widespread phenomenon, as more than 70% of the IPOs in our sample show at least one type of affiliation. We investigate the impact of such affiliations on the pricing of IPOs, in order to understand the primary and secondary market behavior in relation to potential conflicts of interest.

Starting from a literature which is short of consistent empirical results, we are interested in finding new and more convincing evidence on the impact of each individual type of conflict of interest on IPOs, including the cases when all main players belong to the same financial group. Such an analysis is carried out setting apart the effects that any of the potential conflicts of interest produce in the IPO primary and secondary market, respectively determining the offer price of the IPO, and so the absolute price adjustment, and its underpricing.

Our results show that all types of affiliation among players resulted in positive impact on the absolute price adjustment, apparently confirming the dumping ground hypothesis. We contribute to the literature improving the understanding of the effects of the affiliation between venture capitalists and lead managers as well as the affiliation between lead managers and funds. Moreover, we added to the literature a third, up until now unstudied, affiliation between venture capitalist and funds, for which we also found a positive effect on the APA.

We then focused on the secondary market performance, taking into consideration the first day underpricing as a measure of the secondary market reaction right after the IPO. We study the underpricing net of the effects already captured by the price adjustment, in order to focus only on new signals arising from the secondary market. According to our results, only the affiliation between venture capitalist and funds maintains a statistically significant positive effect on performance. Limited to the case of hot IPOs we also have a positive effect on underpricing from the affiliation between LM and F, supporting the so called "nepotism hypothesis". Interestingly, such evidence is opposed to what we found in the primary market.

We therefore introduce a new measure, namely the relative price adjustment, to better understand if affiliations are influencing more the primary or the secondary markets. This analysis lets us better understand the apparent contrasting evidence regarding the affiliation between lead manager and funds in the primary and secondary market, provided that the former led to the dumping ground

hypothesis (higher offer price) whereas the latter led to the nepotism hypothesis (higher underpricing): the relative price adjustment suggests here that the nepotism hypothesis is the one consistent with our result.

Finally, we study the effects of affiliation on a longer horizon performance. Again, only the affiliation between lead managers and funds shows a positive influence on IPO six months returns, signaling that funds affiliated with lead managers participate on average in higher quality IPOs.

We believe our findings are relevant as they prove that in practice investors do not receive the same treatment in IPOs. In particular, unaffiliated investors are less keen on receiving best deals, as opposed to affiliated investors. The asymmetry is even higher in the case of retail investors, as they are not involved in the primary market procedures and their awareness of conflicts of interest among players is strictly limited.

Our results support the growing criticism towards the bookbuilding procedures[5] and the need to improve transparency in the primary market for IPOs. Besides that, we expect affiliation in deals to grow even more in the future, as a consequence of consolidation occurring both in the investment bank and in the asset management industries.

We are also aware of the main limits of our analysis. In particular, we know that ownership linkages are just a part of the effective relationships which might influence the outcome of IPOs. In particular, the well-known practice of cross invitations in IPO syndication and of the laddering (in general we refer to the embeddedness concept), as well as the concentration of major deals in the hands of a few lead underwriters, all require further investigation in order to fully understand the impact of informal relationships on IPO pricing.

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[5] In June 2012 a House of Representatives committee suggested to the Securities and Exchange Commission some change to the Securities Act of 1933, as it allows lead underwriters to "exercise substantial discretion" in establishing the IPO price.

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Appendix

Table A.1 - Absolute Price Adjustment for hot and cold IPOs

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise.

	H1		H2		H3		Multiple Affiliation	
Variables	cold	hot	cold	hot	cold	hot	cold	hot
D_{lockup}	-0.0262	-0.0875***	-0.0234	-0.0754***	-0.0261	-0.0880***	-0.0262	-0.0877***
	0.129	0.000	0.176	0.000	0.130	0.000	0.129	0.000
LM_{rank}	-0.0103**	0.0267***	-0.0143***	0.0142	-0.0105**	0.0252***	-0.0104**	0.0263***
	0.015	0.001	0.003	0.109	0.014	0.002	0.014	0.001
SIZE	0.0158***	0.0094	0.0150***	0.0081	0.0160***	0.0097	0.0157***	0.0096
	0.000	0.157	0.000	0.223	0.000	0.142	0.000	0.150
D_{tech}	0.0412***	0.0974***	0.0405***	0.0952***	0.0410***	0.0922***	0.0414***	0.0963***
	0.004	0.000	0.004	0.000	0.004	0.000	0.004	0.000
D_{year}	-0.0368***	-0.1388***	-0.0440***	-0.1542***	-0.0371***	-0.1405***	-0.0370***	-0.1386***
	0.007	0.000	0.002	0.000	0.007	0.000	0.007	0.000
$D_{VC\ backed}$	-0.0416***	0.0430**	-0.0391***	0.0553***	-0.0431**	0.0246	-0.0424***	0.0469**
	0.004	0.033	0.005	0.005	0.011	0.295	0.003	0.019
D_{ALMVC}	0.0098	0.0748**						
	0.770	0.049						
D_{ALMF}			0.0293*	0.0763***				
			0.072	0.001				
D_{AVCF}					0.0049	0.0482**		
					0.791	0.038		
D_{ALMVCF}							0.0198	0.0568
							0.584	0.202
Constant	-0.0465	-0.0593	-0.0275	-0.0014	-0.0462	-0.0466	-0.0457	-0.0567
	0.191	0.392	0.458	0.984	0.195	0.504	0.200	0.415
Observations	854	914	854	914	854	914	854	914
R-squared	0.061	0.180	0.065	0.187	0.061	0.181	0.061	0.178

Table A.2 – Underpricing for hot and cold IPOs

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise.

Variables	H4 cold	H4 hot	H5 cold	H5 hot	H6 cold	H6 hot	Multiple Affiliation cold	Multiple Affiliation hot
D_{lockup}	0.0214***	-0.1452***	0.0215***	-0.1307**	0.0215***	-0.1458***	0.0215***	-0.1449***
	0.007	0.005	0.007	0.012	0.007	0.004	0.007	0.005
LM_{rank}	0.0043**	0.0074	0.0043**	-0.0080	0.0042**	0.0034	0.0043**	0.0067
	0.026	0.710	0.050	0.713	0.031	0.862	0.027	0.735
SIZE	-0.0013	-0.0590***	-0.0013	-0.0609***	-0.0013	-0.0597***	-0.0012	-0.0594***
	0.493	0.000	0.511	0.000	0.503	0.000	0.522	0.000
D_{tech}	-0.0332***	0.1353***	-0.0334***	0.1342***	-0.0332***	0.1241***	-0.0334***	0.1345***
	0.000	0.004	0.000	0.005	0.000	0.009	0.000	0.005
D_{year}	-0.0142**	-0.1443***	-0.0141**	-0.1657***	-0.0147**	-0.1525***	-0.0140**	-0.1448***
	0.026	0.004	0.033	0.001	0.021	0.002	0.027	0.003
$D_{VC\ backed}$	-0.0107	0.0948*	-0.0103	0.1075**	-0.0133*	0.0280	-0.0101	0.0946*
	0.108	0.054	0.110	0.026	0.088	0.624	0.128	0.052
D_{ALMVC}	0.0037	0.0634						
	0.810	0.495						
D_{ALMF}			0.0000	0.0960*				
			0.996	0.083				
D_{AVCF}					0.0058	0.1346**		
					0.495	0.018		
D_{ALMVCF}							-0.0023	0.0953
							0.889	0.380
APA	0.0145	1.2378***	0.0145	1.2256***	0.0144	1.2282***	0.0145	1.2384***
	0.361	0.000	0.361	0.000	0.363	0.000	0.358	0.000
Constant	-0.0215	0.6463***	-0.0217	0.7198***	-0.0208	0.6880***	-0.0219	0.6537***
	0.189	0.000	0.205	0.000	0.206	0.000	0.183	0.000
Observations	854	914	854	914	854	914	854	914
R-squared	0.050	0.341	0.050	0.343	0.051	0.344	0.050	0.341

Table A.3 - Relative Price Adjustment for hot and cold IPOs

D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry and zero otherwise; D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before; $D_{VC\ backed}$ is a dummy variable equal to 1 where the company is backed by a venture capital company and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated and zero otherwise; D_{ALMVCF} is a dummy variable equal to 1 if venture capitalists, lead managers and at least one of the funds buying the shares are all affiliated and zero otherwise.

Variables	H7 cold	H7 hot	H8 cold	H8 hot	H9 cold	H9 hot	Multiple Affiliation cold	Multiple Affiliation hot
D_{lockup}	-0.0205	0.0908	-0.0256	0.0590	-0.0181	0.0901	-0.0204	0.0901
	0.746	0.194	0.685	0.407	0.774	0.197	0.747	0.197
LM_{rank}	0.0044	-0.0390	0.0164	-0.0071	0.0024	-0.0370	0.0043	-0.0383
	0.782	0.208	0.355	0.836	0.880	0.234	0.787	0.217
SIZE	-0.0016	0.0078	0.0019	0.0121	-0.0010	0.0088	-0.0016	0.0087
	0.917	0.721	0.899	0.579	0.949	0.689	0.918	0.691
D_{tech}	-0.0444	-0.0237	-0.0437	-0.0223	-0.0425	-0.0188	-0.0445	-0.0255
	0.388	0.717	0.394	0.731	0.407	0.773	0.387	0.695
D_{year}	-0.1100**	0.2331***	-0.0875*	0.2699***	-0.1241**	0.2371***	-0.1101**	0.2341***
	0.028	0.001	0.092	0.000	0.014	0.001	0.028	0.001
$D_{VC\ backed}$	0.0785	-0.0308	0.0755	-0.0406	0.0263	0.0068	0.0787	-0.0243
	0.132	0.654	0.134	0.544	0.662	0.934	0.128	0.720
D_{ALMVC}	0.0194	0.0029						
	0.867	0.982						
D_{ALMF}			-0.0876	-0.1718**				
			0.133	0.028				
D_{AVCF}					0.1076*	-0.0636		
					0.100	0.421		
D_{ALMVCF}							0.0213	-0.0753
							0.867	0.611
Constant	-0.0067	-0.9871***	-0.0727	-1.1493***	0.0072	-1.0099***	-0.0060	-0.9963***
	0.960	0.000	0.607	0.000	0.957	0.000	0.964	0.000
Observations	681	707	681	707	681	707	681	707
R-squared	0.013	0.035	0.016	0.041	0.017	0.035	0.013	0.035